Date: Tue, 23 Nov 93 04:30:40 PST
From: Ham-Homebrew Mailing List and Newsgroup <ham-homebrew@ucsd.edu>
Errors-To: Ham-Homebrew-Errors@UCSD.Edu
Reply-To: Ham-Homebrew@UCSD.Edu
Precedence: Bulk
Subject: Ham-Homebrew Digest V93 #111
To: Ham-Homebrew

Ham-Homebrew Digest Tue, 23 Nov 93 Volume 93 : Issue 111

Today's Topics:

Send Replies or notes for publication to: <Ham-Homebrew@UCSD.Edu>
Send subscription requests to: <Ham-Homebrew-REQUEST@UCSD.Edu>
Problems you can't solve otherwise to brian@ucsd.edu.

Archives of past issues of the Ham-Homebrew Digest are available
(by FTP only) from UCSD.Edu in directory "mailarchives/ham-homebrew".

Date: 22 Nov 93 15:44:19 GMT
From: ogicse!emory!wa4mei!ke4zv!gary@network.ucsd.edu
Subject: Amplifier for 1270MHz
To: ham-homebrew@ucsd.edu

In article <CGuIx7.1LE@cbnewsh.cb.att.com> wa2sff@cbnewsh.cb.att.com
(joseph.e.wilkes) writes:
>I am getting active on 1270 satellites and I need an amplifier
>to raise the 10 Watts of my rig upto about 100 watts.
>Are there any good articles or kits for 2c39 amplifiers?
>
>The one the in arrl handbook needs a small machine shop to
>build. Does anyone make kits?

There's a nice German made RF deck sold by the SSB Electronics folks
that uses a pair of 3CX100A5 tubes to give 250 watts SSB, more if you
fit the tubes with the optional water cooling jackets. I have one, it
works fine. Cost's $750 with 2 new tubes installed. Chip Angle used to
market a similar amp under the Angle Linear name. I don't know if it's

still available. The filament and blower supplies are included in the SSB unit, but you have to supply the HV power supply, about 1000-1400 volts at a few hundred mils.

Or you can take the modern approach and use Wilkinson power combiners and a bunch of the 20 watt Mitsubishi solid state bricks. That get's expensive fairly fast though, say 12 modules for a 240 watt amp, and you need a hefty low voltage supply, and insurance that you always have a good termination impedance and lightning protection.

Then there's surplus. I bought a nice 2 tube RF deck at Dayton for $50 that looks like it came out of a military avionics suite. And of course there's the old APX-6. You can build your own, the RSGB books have a design, and the German UHF Compendium has a couple more, that are feasible to build at home with hand tools. Having a lathe would make it easy, of course, but there are designs that can do without one by using nibblers and files, or you can farm that part out to a job shop. You can get by with the Kool Amp silver plating kit, or you can farm that part out to a plating shop too. I do my own machine work, I do have a machine shop, but I send my plating work out, nasty chemicals.

Gary
--

Gary Coffman KE4ZV	Where my job's going,	gatech!wa4mei!ke4zv!gary
Destructive Testing Systems	I don't know. It might	uunet!rsiatl!ke4zv!gary
534 Shannon Way	wind up in Mexico.	emory!kd4nc!ke4zv!gary
Lawrenceville, GA 30244	-NAFTA Blues	

Date: Mon, 22 Nov 1993 19:22:31 GMT
From: qualcomm.com!vixen.cso.uiuc.edu!howland.reston.ans.net!math.ohio-state.edu!magnus.acs.ohio-state.edu!csn!teal.csn.org!dfeldman@network.ucsd.edu
Subject: Amplifier for 1270MHz
To: ham-homebrew@ucsd.edu

In article <1993Nov22.154419.23109@ke4zv.atl.ga.us> gary@ke4zv.atl.ga.us (Gary Coffman) writes:
>In article <CGuIx7.1LE@cbnewsh.cb.att.com> wa2sff@cbnewsh.cb.att.com (joseph.e.wilkes) writes:
>>I am getting active on 1270 satellites and I need an amplifier
>
>There's a nice German made RF deck sold by the SSB Electronics folks
>that uses a pair of 3CX100A5 tubes to give 250 watts SSB, more if you
>fit the tubes with the optional water cooling jackets. I have one, it

Are you aware of any kw-class amps available (not surplus; designed for ham use)? Not for satellite -- interested for weak signal terrestrial...

Date: 22 Nov 93 20:49:23 GMT
From: psinntp!arrl.org@uunet.uu.net
Subject: Amplifier for 1270MHz
To: ham-homebrew@ucsd.edu

In rec.radio.amateur.homebrew, gary@ke4zv.atl.ga.us (Gary Coffman) writes:
>In article <CGuIx7.1LE@cbnewsh.cb.att.com> wa2sff@cbnewsh.cb.att.com
(joseph.e.wilkes) writes:
>>I am getting active on 1270 satellites and I need an amplifier
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>Or you can take the modern approach and use Wilkinson power combiners
>and a bunch of the 20 watt Mitsubishi solid state bricks. That get's
>expensive fairly fast though, say 12 modules for a 240 watt amp, and
>you need a hefty low voltage supply, and insurance that you always have
>a good termination impedance and lightning protection.

Anyone actually blow up these devices with a high SWR despite
good heat sinking? At rated power, they are usually designed to
withstand a 20:1 SWR, though this undoubtedly degrades if you are
running them at twice their rated power :-).

The worst case, assuming the hybrid doesn't fail, is a 3:1 SWR at
the bricks. Thus, I'm not sure why a good termination impedance
is needed. This is one of the advantage of using hybrids combiners.

Keep in mind that it is pretty easy to mount a solid state amp
at the antennas, while only a real *fanatic* would run a water
cooled tube amplifier at the top of a tower. Thus, you might
factor in the feedline loss to get a more realistic comparision.

I'd expect 200 ft of 7/8 inch Heliax or 100 ft of 1/2 inch
Hardline to have 3 dB of loss at 1.3 GHz. Thus, for many
people, 120 watts at the antennas is about the most you
could expect from a tube type amp.

BTW, If you live on a nice hill and run this much power
to even a single loop yagi, I'd expect the troposcatter
range to be several hundred miles. Thus, you might be
able to talk to someone 400 miles away, even when the
conditions are lousy..

Zack Lau KH6CP/1

Internet: zlau@arrl.org
US Mail: c/o ARRL Lab
 225 Main Street
 Newington CT 06111
Phone (if you really have to): 203-666-1541

"Working" on 24 GHz SSB/CW gear
Operating Interests: 10 GHz CW/SSB/FM
80/40/20 CW
Station capability: QRP, 1.8 MHz to 10 GHz
modes: CW/SSB/FM/packet
amtor/baudot

Date: Thu, 18 Nov 1993 17:52:27 GMT
From: dog.ee.lbl.gov!agate!howland.reston.ans.net!sol.ctr.columbia.edu!destroyer!
news1.oakland.edu!rcsuna.gmr.com!kocrsv01!c2xjcb@network.ucsd.edu
Subject: Opto-isolator keying
To: ham-homebrew@ucsd.edu

In article <40010004@opus.hpl.hp.com>, walker@opus.hpl.hp.com (Rick Walker)
writes:
> In rec.radio.amateur.homebrew, jennings@eng115.rochny.USpra.abb.COM
(Tom_Jennings) writes:
>
> >
> > My friend is building a keyer circuit using the Curtis Keyer chiip.
> > He is trying to reduce the size and power cnsumption so he
> > would like to use an opto isolator instead of a relay
> > or transistor type circit for the output stage. His rig is a
> > Kenwood TS-140S. He is interested in circuits which use
> > opto-isolators to key transmitters and use little current.
> > Any suggestions or references?
>
> Use a power fet (like a VN10KM). Zero dissipation on the gate side, and you
> can easily find parts to handle 100V and 1A. Should be fairly bomb-proof.
> If you use an enhancement fet, you can switch directly off the TTL level
> output.
>
> --
> Rick

TS-140 is a solid-state rig, and therefore doesn't have high voltage
on the key input; I've got a TS-140, and made an interface to my PC
which used an 2N2222 (2N3904, 2N4401, etc.) cheap and dirty NPN
transistor. Signal from keyer to base thru resistor, resistor from
base to ground (equal values will set "on" threshold to about 1.5V,
2:1 ratio will make about 2.1V, good for TTL-type feed). Emitter
of course goes to ground, collector to "key" input.

You might also try a FET like the IRF530, IRF520, etc. (needs about
7V of Vgs to get turned on hard), or an IRLZ024 "logic level" FET
(Vgs(th) is about 2-3V, good for TTL and 5V CMOS). I'd feed gate
thru a 1K resistor and a .001uF cap from Gate to Source; this should
prevent any inadvertant oscillation that the FETs are prone to.
--
James C. Bach Ph: (317)-451-0455 The views & opinions expressed
Advanced Project Engr. GM-NET: 8-322-0455 herein are mine alone, and are
Powertrain Strategy Grp Amateur Radio: WY9F NOT endorsed, sponsored, nor
Delco Electronics Corp. Just say NO to UNIX! encouraged by DE or GM.

Date: 22 Nov 93 16:03:58 GMT
From: ogicse!emory!wa4mei!ke4zv!gary@network.ucsd.edu
Subject: single sideband, phasing and T2/R2
To: ham-homebrew@ucsd.edu

In article <2626@arrl.org> zlau@arrl.org (Zack Lau) writes:
>In rec.radio.amateur.homebrew, gary@ke4zv.atl.ga.us (Gary Coffman) writes:
>>
>>There's a real simple way to get a 90 degree shift. Have your oscillator
>>drive a divide by four circuit arranged as one JK driving two other JKs,
>>one driven by Q and the other driven by not Q. You can take your quadrature
>>components from the latter pair of FFs. Of course your oscillator must
>>run at 4X the IF frequency, but that's not a problem. If you use HS parts
>>for the JKs, your quadrature outputs will be nearly ideal square waves
>>which is exactly what you want to drive diode ring mixers efficiently.
>
>I tried flip flops with a 160 meter phasing receiver many years ago.
>It sort of worked, but after doing some calculations, realized that
>you need really *fast* flip flops to get an accurate 90 degree
>phase shift. It probably isn't a problem at 160 kHz with fast logic
>devices, though. On 440 MHz, good luck...

Well sure. :-) If you want to do on channel phasing at UHF, you need
GAS parts, or do it the old fashioned way with a trombone section.
However, good HS parts, or in a pinch ECL parts, will suffice for any
HF band.

>>Getting that blankety blank audio phase shift to be exactly 90 degrees
>>at every frequency over a 3 octave range is still the hard part.
>
>My perspective on this is different. With computer modeling, I think
>you can get an extremely good idea what the phase shift will be at
>audio frequencies. Thus, I had no difficulty modeling my circuit and
>building something that closely approximated my model. Figuring out

>the expected error isn't too difficult, either. On the other hand,
>try and calculate the expected amplitude error through the mixer and
>amplifiers vs. frequency.

Well if you use good diode ring mixers, hard clamped by the driving
square waves, the amplitude error should be tiny. I've used SBL-1s
successfully this way. You shouldn't introduce amplifiers in the
phasing section. However, we need phase errors much less than 1 degree
at each frequency over the audio bandpass to get decent sideband
cancellation, and I haven't been able to do that because the sharp dt
errors introduced between harmonies make the audio sound cruddy, IE there's
a differential time delay that's frequency dependent in the audio phasing
networks that screws up the relationships among the audio components. The
voice winds up sounding dissonant. If the audio is going to sound bad at
high opposite sideband suppression ratios, I'd rather use the filter method.

Gary
--
Gary Coffman KE4ZV | Where my job's going, | gatech!wa4mei!ke4zv!gary
Destructive Testing Systems | I don't know. It might | uunet!rsiatl!ke4zv!gary
534 Shannon Way | wind up in Mexico. | emory!kd4nc!ke4zv!gary
Lawrenceville, GA 30244 | -NAFTA Blues |

Date: 22 Nov 1993 16:17:26 GMT
From: library.ucla.edu!agate!howland.reston.ans.net!math.ohio-state.edu!
news.acns.nwu.edu!casbah.acns.nwu.edu!rdewan@network.ucsd.edu
Subject: Tandem Match from ARRL Handbook: blowing op amps
To: ham-homebrew@ucsd.edu

I have been working on the Tandem Match Computing Power/SWR meter
as described in the Handbook and the mods in the Tech. Correspondence
section of July 1993 QST. I am having a minor problem. One TLC27
has blown an another is getting awfully warm. These darn ICs are
hard to find.

I built the unit using the circuit board from FAR circuits. I checked
it before installing it in a box and it seemed fine. I installed it
and it did not work. There was no V+ voltage. The last pass transistor
in the supply (2N2222A) had blown. Before replacing it, I checked the
board. The V+ to V- resistance was 15 ohms. Fishy. I checked the board
(not in the box any more). No bridges, bent components etc. Finally
tracked it down to a TLC27M4 (quad FET input opamp) that had 15 ohm
resistance between pin 4 and 11 (V+ and V-) pins. This was U3 in the
circuit SWR computing circuit. I took it out and thought that I would
at least get the Power side working. As I was testing, I noticed that
I could not get 7.07 Volts as the step 3 in the calibration calls for

and that U1 was getting warm. (the +-2.5V supplies were ok).

Any suggestions?

For now I have put the project in the box till I find a TLC27M4.

Rajiv
aa9ch
r-dewan@nwu.edu

Date: Thu, 18 Nov 1993 19:01:23 GMT
From: yuma!galen@purdue.edu
To: ham-homebrew@ucsd.edu

References <2cbvcd$m8q@maxwell21.ee>, <CGo6Au.AAn@seastar.org>,
<1993Nov18.151624.4441@ke4zv.atl.ga.us>
Subject : Re: single sideband, phasing and T2/R2

>In article <CGo6Au.AAn@seastar.org> jjw@seastar.org (John Welch) writes:
>>> Why buy a phase shifter for RF?
>>> ...just use a 1/4 wave piece of transmission line after the power divider...
>> Unless you use Teflon coax, the variation in velocity factor
>>from foot to foot makes it difficult to get exactly 90 degrees by
>>calculating the length in inches.

Actually, what I've decided to do is run the T2 board at a fixed freq
(around 400 MHz) and using a DDS board to get VFO and mixing that in
farther down the chain. The transmission line idea will work, since I
only have to tune it once, and it'll stay on that frequency, amen.

I'm impressed at the number of positive comments on this subject.

Galen, KF0YJ

Date: 22 Nov 93 16:17:52 GMT
From: ogicse!emory!wa4mei!ke4zv!gary@network.ucsd.edu
To: ham-homebrew@ucsd.edu

References <CGr8My.8n2@srgenprp.sr.hp.com>,
<1993Nov20.174843.13453@ke4zv.atl.ga.us>, <2cm8so$94p@hpscit.sc.hp.com>
Reply-To : gary@ke4zv.atl.ga.us (Gary Coffman)
Subject : Re: single sideband generation

In article <2cm8so$94p@hpscit.sc.hp.com> rkarlqu@scd.hp.com (Richard Karlquist)

writes:
>In article <1993Nov20.174843.13453@ke4zv.atl.ga.us>,
>Gary Coffman <gary@ke4zv.atl.ga.us> wrote:
>>All very true. However, if you're willing to complicate the receiver,
>>you can use synchronous detection. This recovers the signal that would
>>otherwise be discarded by using SSB reception. And, it can be setup to
>>reject non-correlated signals in one of the sideband bandpasses, IE you
>>get correlation gain for the DSB components, but not for interference
>>and noise which aren't correlated in the two channels. You have to use
>>a fairly fancy common mode correlator circuit to do this.
>
>DSB reception of DSB signals utilizing both sidebands is just as power
>efficient as SSB reception of SSB signals on an *average power* basis.
>However, the PEP to average ratio is 4 to 1 for DSB and only 2 to 1
>for SSB (as pointed out earlier by Alan Bloom). Since both the FCC
>and transmitter technology tend to be peak power limited rather than
>average, DSB effectively has a 3 dB. disadvantage even if you receive
>both sidebands coherently.

Well that's only an issue if you're doing a high power transmitter.
At the QRP levels most homebrew DSB rigs run, it's a moot point.

>The non-correlation of interference is only worth 3 dB.

I've seen this argued back and forth. It's true if you're just using
a summer as a correlator. But more advanced correlators are possible.
In any event, that 3 db makes up for the lost 3 db PEP that might be
an issue at high transmitter power levels.

>And of course none of this works unless you transmit a pilot carrier
>or pilot tone to get exact carrier recovery, as you pointed out.
>For continuous signals like video and data, you can get around that
>by the usual frequency doubler carrier recovery trick.

I understand that the doubler technique can be used with voice too.
The time constant of the PLL has to be altered to a fast attack, slow
decay curve. This may introduce a bit of distortion at the beginning
of syllables if the attack timing is wrong.

The big drawback to DSB remains that it occupies twice the bandwidth
of SSB and thus can cause more interference, though at a lower level,
to adjacent stations.

Gary
--
Gary Coffman KE4ZV | Where my job's going, | gatech!wa4mei!ke4zv!gary
Destructive Testing Systems | I don't know. It might | uunet!rsiatl!ke4zv!gary
534 Shannon Way | wind up in Mexico. | emory!kd4nc!ke4zv!gary

Lawrenceville, GA 30244 | -NAFTA Blues |

Date: 18 Nov 1993 16:57:13 GMT
From: dog.ee.lbl.gov!agate!spool.mu.edu!olivea!inews.intel.com!ilx018-bb.intel.com!ilx049!dbraun@network.ucsd.edu
To: ham-homebrew@ucsd.edu

References <2c4lhr$6pi@hpscit.sc.hp.com>, <1993Nov15.164550.18931@cs.rit.edu>, <2c8ohb$abo@hpscit.sc.hp.com>
Reply-To : dbraun@iil.intel.com
Subject : Re: single sideband

This has been a fascinating discussion! I have been reverse-engineering an old H-P vector impedance meter without benefit of the manual, and it does something very much like SSB generation.

In it there is a VFO that operates (in five bands) from 0.5 MHz to 110 MHz. Its output goes directly to one of the probe connections, as well as to an aluminum box of circuitry. The output of this aluminum box includes another RF signal that is always exactly 5 KHz higher than the VFO frequency. In this signal, there is no detectable leak-through of the VFO freq. or the VFO freq minus 5 KHz. (There is a 5 KHz audio oscillator circuit in the system.)

So: the question is: What kind of circuit will take a RF signal anywhere between .5 MHz and 110 MHz, and generate a signal exactly 5KHz higher, with excellent spurious rejection? It sounds like the SSB "phasing" technique, but with a single fixed audio frequency instead of a speech waveform. This would make the audio phase shifter trivial, but because of the variable RF freq, the RF phase shifter would be (IMHO) very hard to implement! The number of components in the aluminum box is suprisingly small.

Any insight?
--

Doug Braun   Intel Israel, Ltd.   M/S: IDC1-41
               Tel: 011-972-4-655069   dbraun@inside.intel.com

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End of Ham-Homebrew Digest V93 #111
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